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The Reliability of Teachers' Tests of the
Eyesight of School Children

**THE RELIABILITY OF TEACHERS' TESTS OF THE
EYESIGHT OF SCHOOL CHILDREN**

BY

ALFRED WILLIAM GROSS

Ph. B. North-Western College, 1909

THESIS

Submitted in Partial Fulfillment of the Requirements for the

Degree of

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IN

THE GRADUATE SCHOOL

OF THE

UNIVERSITY OF ILLINOIS

1917

UNIVERSITY OF ILLINOIS
THE GRADUATE SCHOOL

June 1,1917

I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPER-
VISION BY Albert William Gross

ENTITLED The Reliability of Teachers' Tests of the Eyesight
of School Children

BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE
DEGREE OF Master of Arts in Education

G. M. Whipple by W. B. Bagley
In Charge of Thesis
W. B. Bagley
Head of Department

Recommendation concurred in:*

} Committee
on
Final Examination*

*Required for doctor's degree but not for master's.

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A. W. G.

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CHAPTER I.

Introduction .

It is not the object of this investigation to attempt to justify examinations of the eyes of school children. Such examinations have long since been conceded to be of vital concern in the conservation of eyesight and are now recognized as a necessary part of all comprehensive health-programs. But the purpose of this investigation is to determine, in view of the continued neglect on the part of legislatures; school officials, and parents, in some communities, to care properly for the eyesight of school children, apparently because such work presumably entails special service and attention, - the advisability of having teachers themselves make preliminary examinations of the eyes of their pupils with a view to discovering the defective ones and referring them to experts or parents for further consideration and attention. There is no reason why every child in the public schools should not be given a preliminary examination of his eyes at least once, if not twice, a year, and, if found defective, turned over to the proper authorities for treatment, instead of the customary way of waiting for chance or charity to step in and here and there save an eye from destruction. Why wait for the long course of expert examination which may never come to some communities if teachers are able with a little testing to recommend which eyes need special attention? If it can be shown that teachers are sufficiently capable to make such preliminary examinations, then it is

quite probable that such tests will be made and children's eyes be given the proper attention. Some states and the school authorities of some communities require teachers to ascertain the condition of each child's sight. Such a law has been in operation in Connecticut since 1899; in Vermont since 1904; in Massachusetts and Colorado since 1906. While the State of New York has no law compelling this examination, it has been held in the incorporated villages of the State since 1907, and has accomplished considerable good. Bulletins of directions to teachers issued through the New York State Department of Health have done much in the way of aiding and facilitating these examinations.¹

The criticism that teachers are not competent to make this eye examination is answered by Dr. Porter, Commissioner of the New York State Department of Health: "It is so simple that it would be an insult to the intelligence of the teacher for any one to infer that they are incompetent to make this test." It is not expected that teachers should diagnose cases; to show that something is wrong is the important thing and should form the basis for further expert diagnosis. That a number of authorities are already convinced of the ability of teachers in this respect is evidenced by the excellent methods and directions that have already been put out for this purpose, but as regards the degree of reliability of teachers' results

1. "Why it is necessary to Examine the Eyes, Ears, Nose and Teeth of School Children," issued by New York State Department of Health.

with any given plan there are as yet no definite determinations. It has been the purpose of this investigation to determine so far as possible with a given set of directions what sort of mistakes a teacher is likely to make, what kinds of eye defects will be found easily, what kinds will escape notice, and what degree of reliability can be placed in these results.

CHAPTER II.

The Nature and Methods of the Experiment.

Several difficulties were encountered at the very outset of this experiment; a method of testing had to be devised; the consent and coöperation of the teachers who were to make the tests had to be obtained; and a reliable means of checking the work of the teachers had to be provided.

In looking over the field of tests and the literature dealing with vision no particular plan was found that was wholly satisfactory, and so it was decided to devise a scheme of testing which would be more specifically adapted to the problem in hand. Of course, such a plan could not be created arbitrarily but had to be based on already established principles. A number of sources were consequently investigated, and with those as a basis the method here used was devised. The very first question to be answered was how extensive to make the tests without making them too difficult and at the same time inclusive enough to be significant of results; accordingly the most common of significant elements of all the sources were selected and made the basis of a somewhat more easily comprehensible and at the same time more inclusive method than any of the sources themselves, so that the results should form a better index of teachers' abilities in this respect than could be determined by any of the other methods. Such authorities as Whipple,¹ Cohn,² Psychological Clinic,³ and N.E.A. Committee on Conservation of

Vision⁴ served excellent means for sharpening the judgment in the selection of the items considered as a basis of the examinations, while a study of various charts and directions now used in making eye-tests afforded practical material from which to formulate directions and select materials best adapted to the determination of the items herein outlined. Most of the charts considered carry with them directions for their use, and are intended for the use of teachers as well as specialists. Those without directions are standard charts for which any one familiar with eye testing can make his own directions. The charts considered were; Snellen, Lowell (modification of Snellen), Allport (modification of Snellen), Swezey (Decorah, Iowa), Kansas University (Department of Education), and the McCallie Vision Tests. The Allport, Swezey, and Kansas University charts were accompanied with many helpful directions. Much helpful material was found in the Conservation of Vision Series published by the American Medical Association, and in pamphlets dealing with vision issued by the New York State Department of Health. After a careful analysis of both the merits and the demerits of the charts named above it was decided to use the Lowell chart for distance tests and the Verhoeff astigmatic chart for astigmatic tests. The Lowell chart has the advantage of having more vision lines than any of the others, and therefore, makes pos-

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1. Manual of Mental and Physical Tests, Part I.
 2. Hygiene of the Eye, Chapter 4.
 3. An Examination of Eyes, Ears, and Throats of Children etc, 1908-09, Vol. 2.
 4. N. E. A. vol. 50.

sible finer determinations. The finer the distinctions, the more significant will be the agreements. The Snellen chart of which the Lowell chart is a modification was constructed by Professor Snellen of Utrecht, the sizes and thicknesses of the vision letters of which he determined scientifically for the distances they should be read by the normal eye. The list of items (Form 2) considered in this study was formulated from points most commonly emphasized by authorities and found in directions for work of this nature, so that the list is more comprehensive and inclusive than any of the similar lists consulted.

A complete set of materials used in this investigation thus consisted of; (1) a sheet of introduction (Form 1) containing a statement of the nature of the problem and materials to be used; (2) a Lowell vision Chart; (3) a Verhoeff Astigmatic Chart; (4) a small card containing the same lines of letters as the Lowell Chart; (5) a cover card; (6) a record sheet for each pupil (Form 2); (7) a sample record sheet; (8) a set of directions (Form 3); and (9) a sheet of general description of eye-defects (Form 4). The function of each of these materials is described in the Forms which follow and so need not be repeated here.

Seventeen teachers selected by random from the elementary schools of Bement, Monticello, and Urbana, three Illinois cities, tested from 7 to 12 of their pupils, each. These same pupils were retested by the writer and the writer's results checked against those of the teachers. As a check on the writer

one teacher's pupils were also examined by Dr. G. F. Scheib, oculist, and his results checked against those of the writer. The results of these tests are found in Chapter 3.

Read this first.

A STUDY OF THE RELIABILITY OF TEACHERS' TESTS OF
THE EYE-SIGHT OF THEIR PUPILS.

All teachers know that defective eye-sight interferes with the best progress of school children. These defects go unremedied largely because of the ignorance or carelessness of parents. In many states and cities provision is made by law for the examination of the eyes of all school children by competent investigators. In Illinois there is no state-wide compulsory medical inspection in the schools. In most communities if anything is done in these directions, it must be done by the initiative of the local school authorities. Can the school accomplish anything worth while without employing experts from outside the school system? Can teachers for instance, make a preliminary examination of the eye-sight of their pupils with sufficient reliability to warrant the introduction of that method in schools generally? Many of us believe they can, but we still lack conclusive evidence of it.

We want to see how nearly you can determine which of your children need to have their eyes attended to; we want to see what sorts of mistakes a teacher is likely to make, what kinds of eye-defects will be found easily, what kinds will escape notice. The general plan of the investigation is as follows; the teacher receives printed directions for carrying on tests of the eye-sight of her pupils; she will carry out these directions as faithfully and accurately as possible without further assistance of any kind. After she has submitted her results, the pupils will be re-examined by a trained examiner whose findings will then be compared with those of the teacher not to test the competence of the teacher, but the feasibility of this method in general.

The directions for making the tests will be found on another sheet. The materials supplied herewith for your use are: (1) a chart of test letters, (2) an astigmatic chart, (3) a card for the use of the teacher containing the same lines of letters as on the chart, (4) a black cover card about 3 x 5 inches, (5) a record sheet for each pupil, (6) one of these record sheets filled out for a sample, (7) a set of directions, and (8) a sheet of general description of eye defects.

Arrangements for participation in this investigation should be made with A. W. Gross, 907 West Main Urbana, Illinois, who is making the investigation, or with Professor G. M. Whipple, of the University of Illinois, under whose direction the work is being done.

RECORD SHEET.

(This sheet is to be returned to A.W.Gross, 907 W. Main, Urbana, Ill.)

Pupil Age Grade School

Tester (Teacher) City Date

(Do not write in "Check" Columns)

	Right eye	Check	Left eye	Check
1. Lowest line read				
2. Visual acuity score	<u>6</u>		<u>6</u>	
3. Astigmatic defect (Check numbers of radii appearing least black)	<div style="text-align: center;"> 5 12 1 4 2 3 3 2 1 6 5 4 </div>		<div style="text-align: center;"> 5 12 1 4 2 3 3 2 1 6 5 4 </div>	
4. Is eye myopic (near-sighted)?				
5. Is eye hyperopic (far sighted),				
6. Is eye astigmatic?				
7. Is eye cross-eyed (Strabismus)?				
8. Does pupil frequently suffer from inflamed lids or eyes?				
9. Does pupil complain of frequent headaches?				
10. Was pupil tested with glasses on?				
11. Any other important defects?				
12. How serious do you consider this case? (not, little, quite, very)				
13. What recommendations would you make?				
14. Critical comments on this investigation?				

FORM 3.
(7)

DIRECTIONS FOR MAKING EYE TESTS

1. Read all directions and all papers, and become familiar with all materials before proceeding with the tests.
2. Fasten the vision chart to a wall in such a position that it shall be well lighted though not in direct sunlight, nor covered with a glass. The bottom of the chart should be about 30 inches from the floor.
3. Do not expose the chart when not in use, as familiarity with its face leads children to learn the letters by heart. At no time should pupils be permitted to approach within 20 feet of the chart.
4. Examine each pupil privately and singly.
5. Children already wearing glasses should be tested with their glasses properly adjusted on the face.
6. Test and examine each eye separately, but have the pupil keep both eyes open all the time. Hold the cover-card over one eye while the other is being examined, but do not press upon the covered eye.
7. Seat the pupil 6 meters (approximately 20 feet) from the chart.
8. Have the pupil begin at the top of the chart and read the lines aloud as far down as he can, first with the right and then with the left eye. Write on the Record Sheet (Item 1) the number of the lowest line read by each eye. By "lowest line" is meant the smallest print at which the pupil can read correctly all the letters or all but one. If he hesitates to try the more difficult lines, encourage him to guess.
9. Next, hang up the astigmatic chart, and covering each eye in turn, have the pupil tell which, if any, of the straight lines (radial) seem blacker (or sharper) than the rest. If any of the lines seem blacker, then others will seem lighter. Check the numbers of the radial appearing lighter, in Item 3 of the record Sheet. If the pupil has been found to be nearsighted, it will be necessary to have him approach the astigmatic chart, say 10 feet, in order to observe it properly.
10. Before dismissing the pupil, get answers to at least Items, 7, 8, and 9 of the Record Sheet. It is best to fill out the remainder of the Record Sheet before proceeding with the next pupil.

Form 3 Cont'd

11. Consult the sheet on "Explanations and descriptions" for further interpretation of the Record Sheet, Make a note for report to the investigator of any matter that causes perplexity.

12. Do not reveal the results of your tests to your co-laborers, as they may be called upon to examine the same pupils you have examined. Besides, it will be necessary that your pupils to re-examined by another person, quite likely an expert, in order that your results may be checked. Hence the need of preventing your pupils and others from learning your results while this investigation is in progress.

FORM 4.

(8)

EXPLANATIONS AND DESCRIPTIONS OF EYE DEFECTS.

(Adapted from "A Teachers" Manual for the Use of Binet-Simon Scale of Intelligence" - by Raymond A. Schwegler.)

There are in general, five kinds of visual defects:

1. Amblyopia - a dimness of vision due to deficiency of the nervous mechanism involved in seeing. It may be congenital and incurable, or a mere by-product of nervous disturbance.
2. Asthenopia - a weakness of the retinal and other visual mechanisms due to strain or disease. It is usually relieved by suitable hygienic measures. Asthenopia may be found with or without ametropia.
3. Color-blindness - either of red-green, or blue-yellow, or of a mixed type. The defect occurs in about 4% of males, and in less than 0.5% of females. It is usually congenital and incurable. For a detailed discussion of the theory of and tests for, this interesting deviation, see Whipple's Manual of Mental and Physical Measurements, 2nd Ed., Vol 1, pp. 181-193.
4. Ametropia - a failure of the refractive mechanism of the eye to bring the light rays to a sharp focus on the retina. In the children to be tested the focal point may lie in front of the retina (eye-ball too long-myopia, or nearsightedness); or it may lie behind the retina (eye-ball too short- hyperopia, or farsightedness); or the cornea may present irregular convexity (astigmatism). All three types of refractive error need lenses, which should in every case be prescribed by an expert.
5. Motor Asymmetry - a defective co-ordination of the six muscles controlling each eye, with the result that the two eyes do not properly point in the same direction at once. This defect may be latent (heterophoria), or it may be evident (heterotropia, strabismus, or cross-eyes). Mild forms of heterophoria are very common but may be neglected. Serious cases of heterophoria, and all cases of heterotropia should be given medical attention as early as possible. (for a full discussion of terminology and tests for heterophoria, see Whipple, op. cit., pp. 175-181)

—X—

At a distance of 6 meters (approximately 20 feet) the normal eye should be able to read Line 8 (the line marked "6 M"). Visual acuity may therefore be scored as a fraction whose numerator is 6, the distance in meters the pupil is from the chart, and whose denominator is the number over the last line read. If the lowest line the pupil reads with his right eye at 6 meters is marked

FORM 4. Cont'd

"10 M" (Line 6), then the visual acuity of his right eye is 6/10, and the eye is myopic (nearsighted). If the lowest line the pupil reads with his left eye at 6 meters is marked "4 M" (line 10), then the visual acuity of his left eye is 6/4, and the left eye is either hyperopic (farsighted) or normal.

"If either of the eyes reported any of the divergent lines (radii) blacker than the rest, that eye is astigmatic, and the direction of the lines seen grayer than the rest indicates the axis of the corneal irregularity. Astigmatism is exceedingly common, and few cases of either myopia or hyperopia occur which are not complicated with it," "Even slight degrees of ametropia, especially those complicated with astigmatism, are likely to lead to serious nervous and physical consequences. The afflicted child should always be urged to seek competent counsel and treatment."

—X—

The interpretation of the Sample Record Sheet in part is as follows:

The lowest line John Smith can read with his right eye at 6 meters from the chart is Line 6; with his left eye, Line 10. His right eye is therefore slightly nearsighted, while his left eye is slightly farsighted. His right eye has astigmatism, but the left eye is free from the same. Neither eye is cross-eyed. By observation, or by questioning John, the teacher has discovered that he habitually suffers from inflamed lids, and that he is slightly color-blind. The teacher considers John's case very serious. He was examined without glasses.

CHAPTER III.

Tabulation and Results of Tests.

In tabulating the results of this experiment only such items were considered as are significant as reliability factors. Thus, of the items of the record sheet, 1 and 2 are considered together, while 10 and 11 are omitted entirely, 10 having been inserted for the writer's benefit and 11 having turned out to be practically a negligible quantity.

Table 1 is a tabulation of the results of the tests made by the writer of the ten pupils of teacher A in terms of the results obtained by the expert, Dr. Scheib. The numbers at the top of the table correspond respectively to numbers of the items of the Record Sheet, Form 2. The letters a, c, l, and n indicate respectively complete agreement, close or substantial agreement, little agreement and no agreement. The double spaces of each of items, 1 & 2, 3, 4, 5, 6, and 7, are respectively for the right and left eyes. To the right are summaries by pupils; at the bottom of the table, summaries by items.

In order that the method of scoring may be better comprehended the results as actually obtained by the writer with pupils, 1, 7, and 10 are given in charts 1, 2, and 3, and the results as actually obtained by the expert, Dr. Scheib, with the same pupils given in charts 4, 5, and 6.

Tables 2 to 18 represent the tabulation of the results of the tests made by the seventeen teachers respectively of their pupils in terms of the results obtained by the writer.

Tables 19, 20, 21, and 22 represent the summaries respectively of the a-cases, c-cases, l-cases, and n-cases of the items in tables 2 to 18, or the totals for each of these cases respectively for all the teachers combined.

Reference to Table 1 will show that there is a high correlation between the results of the writer and Dr. Scheib. Out of the 160 results considered there are 116 in which there is complete agreement, 21 in which there is close agreement, 14 in which there is little agreement, and only 9 in which there is no agreement. The 9 cases in which there is no agreement become still less significant when it is observed that in item 13 which is one of the most significant of the items there is almost complete agreement. In other words, no eyes which certainly needed expert attention were overlooked by the writer. The two cases of little agreement in item 13 are explained by the fact that Dr. Scheib believed an examination under atropine necessary before an absolute statement could be made. The greatest disagreement is that in item 5 in the case of Pupil 1, Table 1. Any one using the simple tests would have made this mistake as is evidenced by a study of the detailed reports found in charts 1 and 4. A note attached by Dr. Scheib to the report represented in chart 4 showed that he himself would not have discovered this fact had he not at the request of the parent made a complete scientific examination of this case under atropine. The significant fact however, is that the simple test used by the writer, while it did not reveal the actual condition, did reveal that something was radically wrong and that therefore expert

examination was necessary, which is after all the important thing so far as the teacher is concerned.

Reference to tables 19, 20, 21, and 22, show that out of 2512 cases, 1790 or 71.5 % represent complete agreement; 216 or 8.5%, close agreement; 152 or 6%, little agreement; and 354 or 14 % no agreement. That is the results obtained by the teachers agree closely or completely with those of the writer in 80 cases in 100, and disagree completely or considerably with those of the writer in only 20 cases in 100. There is thus a high degree of probability that teachers will be fairly accurate in their results of eye tests in terms of the items in general as used here. An examination of the table further will reveal the fact that the greatest sources of disagreement or no agreement are found in items 1 & 2, 3, 4, 6, and 13. The variations in items 1 & 2 may be partially explained on the grounds of poor illumination when making the tests as during this time there was much cloudy weather. The results of items 3 and 6 may be explained on the difficulties involved in getting pupils to state correctly just what they saw, especially was this true in cases of the lower grades. As item 4 is to a considerable extent dependent upon item 1 & 2, we would expect its results to be modified by those of item 1 & 2. In the case of item 13, the most significant of all the items, the 29 cases of no agreement are not so significant as may seem. They would be very significant if they represented 29 cases overlooked by the teachers, but as a matter of fact they are in part cases recommended for treatment by teachers, which the writer found not to

need treatment. Of the 57 cases (pupils) recommended for treatment by the writer only 17 were actually overlooked by the teachers. This again is not so unusual when we consider that the teachers making the tests had practically no experience in such work and did this for the first time with nothing but the directions herein described to guide them. Again, a number of the 17 cases overlooked were cases in which the teachers failed to recommend although their record sheets showed that some of the cases were serious ones. Items 5, 7, 8, 9, and 12 show the most agreement. Item 7, however, cannot be considered significant as there were too few cases of strabismus.

The results of this investigation can hardly be considered an index of the condition of public school children's eyes as several of the teachers admitted to have selected those pupils they suspected to be defective. The pupils examined were from the first to the eighth grades inclusive.

TABLE I
Items.

Tester	Pupil	1 & 2	3	4	5	6	7	8	9	12	13	a	c	e	n
Gross	1	re a	a l	l n	n n	a c	c a	a	a	a	a	8	3	2	3
	2	a	l l	a a	c c	c c	a a	a	l	c	l	7	5	4	0
	3	n	a a	n a	a a	a a	a a	a	a	l	l	11	1	2	2
	4	n	a a	n a	a a	c c	c a	a	a	l	a	9	3	2	2
	5	a	a a	a a	l l	a a	a a	a	a	a	a	14	0	2	0
	6	a	c c	a a	a a	a a	a a	a	a	a	a	14	2	0	0
	7	c	a a	a a	c a	a a	a a	a	a	a	a	13	2	1	0
	8	c	a a	a a	a a	a a	a a	a	a	c	a	13	3	0	0
	9	a	a a	a n	a n	a a	a a	l	a	a	a	12	1	1	2
	10	a	a a	a a	a c	a a	a a	a	a	a	a	15	1	0	0
Complete agreement	a	6	4	8	7	6	6	8	7	8	10	9			
Close agreement	c	2	4	1	1	2	1	2	3	2	0	0	21		
Little agreement	l	0	2	1	2	1	1	0	0	0	0			14	
No agreement	n	2	0	0	0	2	2	1	2	0	0				9

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CHART I.
(5)

RECORD SHEET

(This sheet is to be returned to A.W.Gross, 907 W. Main Urbana, Ill)

Pupil1.....Age...12...Grade....6.....School.L...

TesterA. W. Gross.....City.....U.....Date...5/10-17....

	Right eye	Check	Left eye	Check
1. Lowest line read	7		4	
2. Visual acuity score	<u>6</u> 7.5		<u>6</u> 15	
3. Astigmatic defect (check numbers of radii appearing least black)	<div style="display: flex; justify-content: space-around;"> 451212 </div> <div style="display: flex; justify-content: space-around;"> 3O.K.3 </div> <div style="display: flex; justify-content: space-around;"> 21654 </div>		<div style="display: flex; justify-content: space-around;"> 51212 </div> <div style="display: flex; justify-content: space-around;"> 4O.K.3 </div> <div style="display: flex; justify-content: space-around;"> 32165 </div>	
4. Is eye myopic (Near-sighted)?	slightly		yes	
5. Is eye hyperopic (far sighted)?	No.		No.	
6. Is eye astigmatic?	No.		No.	
7. Is eye cross-eyed (strabismus)?	irrg. ?		No.	
8. Does pupil frequently suffer from inflamed lids or eyes?	No.			
9. Does pupil complain of frequent headaches?	No.			
10. Was pupil tested with glasses on?	No.			
11. Any other important defects?	---			
12. How serious do you consider this case? (Not, little, quite, very).	Very			
13. What Recommendations would you make?	Consult expert.			
14. Critical comments on this investigation				

CHART 2.

(5)

RECORD SHEET.

(This sheet is to be returned to A.W.Gross, 907 W. Main Urbana, Ill)

Pupil7.....Age...11....Grade/...6th.School...L:.....

TesterA.W.Gross,.....City.....U.....Date..5/10-17:.....

	Right Eye	Check	Left Eye	Check
1. Lowest line read	9		8	
2. Visual acuity score	$\frac{6}{5}$		$\frac{6}{6}$	
3. Astigmatic defect (Check numbers of radii appearing least black)	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> 5 12 1 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 4 2 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 3 0.K. 3 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 2 1 6 5 4 </div> </div>		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> 5 12 1 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 4 2 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 3 0.K. 3 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 2 1 6 5 4 </div> </div>	
4. Is eye myopic (near-sighted)?	No.		No.	
5. Is eye hyperopic (far-sighted)?	Slightly ?		No.	
6. Is eye astigmatic?	No.		No.	
7. Is eye cross-eyed (strabismus)?	No.		No.	
8. Does pupil frequently suffer from inflamed lids or eyes?	No.			
9. Does pupil complain of frequent headaches?	No.			
10. Was pupil tested with glasses on?	No.			
11. Any other important defects?	---			
12. How serious do you con- sider this case? (Not, little, quite, or very)	---			
13. What recommendations could you make?	----			
14. Critical comments on this investigation?	----			

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CHART 3.
(5)

RECORD SHEET

(This sheet is to be returned to A.W.Gross, 907W. Main, Urbana, Ill.)

Pupil.....10.....Age...10...Grade..5th..School....1....

Tester ...A..W..Gross,.....City.....U:.....Date.5/10-17.....

	Right Eye	Check	Left Eye	Check.
1. Lowest line read	8		7	
2. Visual acuity scroe	$\frac{6}{6}$		$\frac{6}{7.5}$	
3. Astigmatic defect (Check numbers of radii appearing least black)	<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> 5 12 1 4 2 3 0.K. 3 2 4 1 6 5 </div>		<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> 5 12 1 4 2 3 0.K. 3 2 4 1 6 5 </div>	
4. Is eye myopic (near sighted)?	No.		Slightly	
5. Is eye hyperopic (far-sighted)?	No.		No.	
6. Is eye astigmatic?	No.		No.	
7. Is eye cross-eyed (strabismus)?	No.		No.	
8. Does pupil frequently suffer from inflamed lids or eyes?	No.			
9. Does pupil complain of frequent headaches?	No.			
10. Was pupil tested with glasses on?	No.			
11. Any other important defects?	---			
12. How serious do you consider this case? (Not, little, quite, or very)?	---			
13. What recommendations would you make?	---			
14. Critical comments on this investigation?				

CHART 4.
(5)

(This sheet is to be returned to A.W.Gross, 907 W. Main, Urbana, Ill)

Pupil.....¹.....Age...¹²...Grade...^{6th}...School...^L:.....

TesterDr.:^{Scheib}.....City....U:.....Date..^{5/19-17}..

	Right Eye	Check	Left Eye	Check.
1. Lowest line read	8		4	
2. Visual acuity score	$\frac{6}{6}$ 2		$\frac{6}{10}$ 1	
3. Astigmatic defect (Check numbers of radii appearing least black)	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $\begin{matrix} & 5 & 12 & & \\ 4 & & & & 2 \\ 3 & & 0.K & & 3 \\ 2 & & & & 4 \\ & 1 & 6 & 5 & \end{matrix}$ </div> </div>		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $\begin{matrix} & 5 & 12 & & \\ 4 & & & & 2 \\ 3 & & & & 3 \\ 2 & & & & 4 \\ & 1 & 6 & 5 & \end{matrix}$ </div> </div>	
4. Is eye myopic (near-sighted)?	No.		No.	
5. Is eye hyperopic (far-sighted)?	Yes		Yes	
6. Is eye astigmatic?	No.		?	
7. Is eye cross-eyed (strabismus)?	NO.		No.	
8. Does pupil frequently suffer from inflamed lids or eyes?				
9. Does pupil complain of frequent headaches?				
10. Was pupil tested with glasses on?	Yes and pupil accepts lenses in each eye.			
11. Any other important defects?			Amblyopia Congenital	
12. How serious do you consider this case? (Not, little, quite or very)?	Quite in right and very in left eye.			
13. What recommendations would you make?	Eyes should be examined under atropine.			
14. Critical comments on this investigation?				

CHART 5
(5)

RECORD SHEET.

(This sheet is to be returned to A.W.Gross, 907 W. Main, Urbana, Ill)

Pupil.....7.....Age...11.....Grade....6th...School...L...

TesterDr...Scheib.....City.....U.....Date..5/15-17:.....

	Right Eye 10 ⁻²	Check	Left Eye 10 ⁻²	Check.
1. Lowest line read				
2. Visual acuity score	$\frac{6}{5}$		$\frac{6}{5}$	
3. Astigmatic defect (Check numbers of radii appearing least black)	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> 5 12 1 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 4 2 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 3 O.K. 3 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 2 4 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 1 6 5 </div> </div>		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> 5 12 1 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 4 2 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 3 O.K. 3 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 2 4 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 1 6 5 </div> </div>	
4. Is eye myopic (near-sighted)?	No.		No.	
5. Is eye hyperopic (far-sighted)?	No.		No.	
6. Is eye astigmatic?	No.		No.	
7. Is eye cross-eyed (strabismus)?	No.		No.	
8. Does pupil frequently suffer from inflamed lides or eyes?	No.			
9. Does pupil complain of frequent headaches?	No.			
10. Was pupil tested with glasses on?	Yes, did not accept any glasses.			
11. Any other important defects?	No.			
12. How serious do you con- sider this case? (Not, little, quite, or very)?	O.K.			
13. What recommendations would you make?	Not any.			
14. Critical comments on this investigation?				

CHART 6.

(5)

RECORD SHEET.

(This sheet is to be returned to A.W.Gross,907 W.Main,Urbana,Ill)

Pupil10.....Age...10....Grade...5th...School....L:.....

TesterDr.:Scheib;.....City.....U:.....Date...5/15-17:...

	Right eye,	Check	Left Eye	Check.
1 Lowest line read	8		7	
2. Visual acuity score	$\frac{6}{6}$		$\frac{6}{6}$	
3. Astigmatic defect (Check numbers of radii appearing least black)	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> 5 12 1 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 4 2 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 3 O.K. 3 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 2 4 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 1 6 5 </div> </div>		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> 5 12 1 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 4 2 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 3 O.K. 3 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 2 4 </div> <div style="display: flex; justify-content: space-between; width: 100%;"> 1 6 5 </div> </div>	
4. Is eye myopic (near-sighted)?	No.		No.	
5. Is eye hyperopic (far-sighted)?	No.		No.	
6. Is eye astigmatic?	No.		No.	
7. Is eye cross-eyed (strabismus)?	No.		No.	
8. Does pupil frequently suffer from inflamed lids or eyes?	No.			
9. Does pupil complain of frequent headaches?	No.			
10. Was pupil tested with glasses on?	Yes - did not accept glasses.			
11. Any other important defects?				
12. How serious do you consider this case? (Not, little, quite, or Very?)	Not.			
13. What recommendations would you make?	None.			
14. Critical comments on this investigation.				

TABLE 2.
Items.

Teacher	Pupil	1 & 2	3	4	5	6	7	8	9	12	13	a	c	l	n
A	1	c	a	a	a	a	c	a	a	a	a	12	4	0	0
	2	a	a	a	a	a	a	a	a	c	c	12	4	0	0
	3	a	a	a	a	a	a	a	a	1	n	12	1	1	2
	4	c	a	a	a	l	n	a	a	c	n	8	3	1	4
	5	c	a	a	c	a	a	a	a	a	a	12	4	0	0
	6	n	a	n	a	a	a	a	l	a	a	11	0	2	3
	7	a	a	a	a	l	a	a	a	a	a	14	0	1	1
	8	c	a	a	a	a	a	l	a	c	a	12	3	1	0
	9	l	a	a	n	a	a	a	l	c	n	9	1	3	3
	10	a	a	l	a	n	a	a	a	l	a	12	0	2	2
	A	4	8	9	8	7	8	8	8	4	6	114			
	C	4	0	1	1	2	0	0	0	4	1		20		
	L	1	0	1	0	1	0	2	2	2	0			11	
	N	1	2	1	1	0	0	0	0	0	3				15

TABLE 3.
Items.

[illegible]

TABLE 4
Items.

[illegible]

Table 6.

Items.

Teacher	Pupil	1 & 2	3	4	5	6	7	8	9	12	13	A.	C	L	N
E	1	r.e l	a	a	a	n	a	a	a	c	n	11	1	1	3
	2	a	a	a	a	a	a	a	a	1	n	12	0	1	3
	3	l	l	a	a	n	a	a	a	a	a	11	1	3	1
	4	n	a	n	a	a	a	a	a	c	c	11	3	0	2
	5	c	a	l	a	a	a	a	a	a	a	13	1	2	0
	6	a	c	a	l	a	a	a	1	a	c	12	2	2	0
	7	l	l	a	a	c	l	l	n	c	a	7	3	4	2
	8	a	a	a	a	a	a	a	a	a	a	16	0	0	0
	A	3	4	6	5	7	6	8	6	4	4	93			
	C	1	0	0	0	1	0	0	0	3	2		11		
	L	3	2	1	0	0	1	2	1	1	0			13	
	N	1	1	1	0	2	0	0	1	0	2				11

TABLE 7.
Items.

[illegible]

Table 10
ITEMS

Teacher	Pupil	1 & 2	3	4	5	6	7	8	9	12	13	a	c	L	n
I	1	R, E, L, E	n	a	a	n	a	a	a	L	n	9	0	1	6
	2	a	a	a	a	c	a	a	a	a	a	14	2	0	0
	3	a	a	a	a	n	a	a	a	a	a	14	0	0	2
	4	a	a	a	a	a	a	a	c	a	a	13	2	0	1
	5	a	a	a	a	n	L	a	a	a	a	10	0	2	4
	6	L	a	n	a	a	a	a	c	c	n	9	2	1	4
	7	c	a	a	a	a	L	a	a	a	a	12	2	2	0
	8	L	a	a	n	a	a	a	n	n	n	6	0	1	9
	9	c	a	a	a	a	a	n	n	n	n	11	1	0	4
	10	a	a	a	a	a	a	a	a	a	a	16	0	0	0
	11	L	a	a	a	a	a	a	L	c	a	12	2	2	0
	a	5	6	8	10	7	9	10	6	6	7	126			
	c	2	3	0	0	1	0	0	2	2	0		11		
	L	3	0	0	0	0	2	0	1	1	0			9	
	n	1	2	3	3	3	0	1	2	2	4				30



Table 13
ITEMS

Teacher	Pupil	1 & 2	3	4	5	6	7	8	9	12	13	a	c	L	n
L	1	R.E.L.E. a	a	n	a	a	a	a	a	n	a	12	1	0	3
	2	L	a	n	a	a	a	L	a	a	a	11	1	2	2
	3	a	a	n	a	a	a	a	a	a	a	12	1	1	2
	4	a	a	a	a	a	a	L	a	a	a	13	1	1	1
	5	c	a	n	a	a	a	a	a	a	a	11	2	0	3
	6	c	a	n	a	a	a	n	n	a	a	10	2	0	4
	7	a	a	a	a	a	a	n	a	a	a	15	0	0	1
	8	a	a	c	c	n	a	a	a	a	a	10	4	0	2
	9	L	L	n	a	n	a	L	L	L	n	6	0	6	4
	10	c	a	a	a	a	a	a	a	a	a	13	2	1	0
	11	c	a	a	a	a	a	a	a	a	a	12	2	0	2
	12	a	a	a	n	a	a	a	a	a	a	13	1	0	2
	a	5	4	10	7	6	6	7	10	10	11	138			
	c	4	7	0	1	1	0	0	0	0	0		17		
	L	2	1	0	0	0	0	3	1	1	0			11	
-	N	1	0	2	4	3	4	2	1	1	1				26

Table 14

ITEMS

Teacher	Pupil	1 & 2	3	4	5	6	7	8	9	12	13	a	c	L	n
M	1	R.E.L.E. a c	a	a a	a	L	a	a	L	a	a	10	1	3	2
	2	c c	a	L a	a	n	a	a	a	a	a	9	2	1	4
	3	a a	n	a a	a	n	a	a	a	n	n	12	0	0	4
	4	n n	a	a a	n	a	a	a	a	a	c	11	1	0	4
	5	a a	n	a a	n	a	a	a	n	L	n	8	0	2	6
	6	L L	a	a a	n	L	a	a	a	a	a	12	0	3	1
	7	c c	a	a a	a	a	a	L	a	a	L	12	2	2	0
	8	a a	n	a a	a	n	a	a	a	a	a'	12	0	0	4
	9	c a	a	a a	n	a	a	a	a	a	a	14	1	0	1
	10	L L	a	a a	n	a	a	a	n	a	a	11	0	2	3
	11	a c	n	L a	a	n	a	a	c	a	a	9	2	1	4
	12	c c	a	n a	a	a	a	a	a	a	a	11	2	0	3
	a	5 4 8	6	9 11	7 8	8 6	12 12	10	7	10	8	131			
	c	4 5 0	0	0 0	0 0	0 0	0 0	0 0	1	0	1		11		
	L	2 2 0	0	2 0	0 2	0 1	0 0	2	1	1	1			14	
	n	1 1 4	6	1 1	5 2	4 5	0 0	0 0	3	1	2				36

Table 15
ITEMS

Teacher	Pupil	1 & 2	3	4	5	6	7	8	9	12	13	a	c	L	n
N	1	R.E.L.E.	a	a	a	a	a	a	a	a	a	16	0	0	0
	2	c	a	L	a	a	a	a	a	a	a	12	2	2	0
	3	a	a	a	a	c	a	L	a	c	c	10	4	1	1
	4	a	n	c	a	n	a	c	c	c	c	6	6	0	4
	5	c	a	a	a	a	a	a	a	c	c	13	3	0	0
	6	a	a	a	a	a	a	a	a	c	a	13	2	0	1
	7	a	a	a	a	a	a	a	a	c	a	15	1	0	0
	8	a	a	a	a	a	a	a	a	c	a	15	1	0	0
	9	a	a	a	a	a	a	a	a	a	a	14	0	1	1
	10	L	a	a	a	a	a	n	a	a	a	11	0	1	4
	a	7	9	8	10	8	10	7	9	4	7	125			
	c	2	0	1	0	1	0	1	1	6	3	19			
	L	1	0	1	0	0	0	1	0	0	0			5	
	n	0	1	0	0	1	0	1	0	0	0				11

Table 16
ITEMS

Teacher	Pupil	1 & 2	3	4	5	6	7	8	9	12	13	a	c	L	n
0	1	R.E.L.E. n	a	n	a	a	a	a	a	n	n	10	0	0	6
	2	n	a	a	a	a	a	a	c	c	L	11	2	1	2
	3	n	a	a	a	a	a	a	a	L	n	12	0	1	3
	4	c	n	a	a	n	a	a	n	a	a	11	2	0	3
	5	c	n	n	n	c	a	a	n	c	c	4	5	0	7
	6	L	a	n	a	a	a	a	n	a	a	9	0	2	5
	7	c	a	a	a	a	a	a	n	a	a	11	2	0	3
	8	a	a	n	a	a	a	n	a	a	a	13	0	0	3
	9	c	a	n	n	a	a	a	a	a	a	10	1	0	5
	10	c	a	n	a	a	a	a	a	c	c	10	4	0	2
	11	a	n	a	a	n	a	a	a	n	n	12	0	0	4
Complete Agree- ment	a	2	8	5	9	10	11	10	6	5	5	113			
Close or Substanti Agreement	c	5	0	0	0	1	0	0	1	3	2		16		
Little Agree- ment	L	1	0	0	0	0	0	0	0		1			4	
No Agree- ment	n	3	3	6	2	1	2	1	4	2	3				43

Table 18
ITEMS

Teacher	Pupil	1 & 2	3	4	5	6	7	8	9	12	13	a	c	L	n
Q	1	R.E.L.E C	a	a	L	a	a	a	n	a	a	11	2	2	1
	2	a	a	a	a	a	a	a	a	c	L	12	1	1	2
	3	c	a	a	c	a	a	a	a	a	a	12	4	0	0
	4	L	L	n	a	n	L	a	n	L	n	3	0	5	8
	5	n	a	a	a	a	a	a	a	a	a	13	1	0	2
	6	c	a	a	a	a	a	a	n	a	a	13	2	0	1
	7	c	a	a	c	a	a	a	a	a	a	12	4	0	0
	8	L	a	a	a	a	a	a	a	L	n	10	0	3	3
	9	c	a	a	a	a	a	a	a	a	a	14	1	0	1
	10	c	n	a	a	n	a	a	a	a	a	10	2	0	4
	11	a	a	a	a	a	a	a	n	c	a	12	1	2	1
	12	c	a	a	L	a	a	a	a	c	n	7	2	2	5
	a	2	10	7	8	10	11	12	8	7	8	129			
	c	7	0	0	2	0	0	0	0	3	0		20		
	L	2	1	0	2	0	0	0	0	2	1			15	
	n	1	4	2	0	2	0	2	4	0	3				28

Table 19
AWWCASES ITEMS.

Teacher	1 & 2	3	4	5	6	7	8	9	12	13	TO- tals
A	R.E.L.E 4	8	9	8	6	8	10	8	4	6	114
B	2	5	7	8	5	8	8	7	5	4	95
C	1	6	7	7	6	7	7	5	5	5	83
D	3	7	7	4	7	7	8	7	3	3	89
E	3	6	8	5	5	6	7	6	4	4	93
F	5	7	7	8	8	7	8	7	6	5	107
G	4	6	6	4	8	6	8	8	6	6	99
H	2	3	5	7	5	4	8	6	4	6	89
I	5	8	8	10	7	9	9	10	6	7	126
J	2	5	5	4	4	8	8	6	4	7	86
K	3	5	3	6	5	4	8	4	8	5	86
L	5	10	7	6	10	9	12	7	10	11	138
M	5	8	6	9	11	6	12	10	7	8	131
N	7	9	7	8	6	10	10	7	9	4	125
O	2	8	8	5	8	11	11	10	6	5	113
P	3	5	4	7	4	7	6	6	7	5	87
Q	2	10	7	10	10	11	12	10	8	7	129
Totals	58	116	111	114	107	150	149	123	123	93	1790

Table 20
C--CASES ITEMS

Teacher	1 & 2	3	4	5	6	7	8	9	12	13	To- tals
A	R.F.L.F. 4	0	1	1	2	0	0	0	4	1	20
B	5	4	0	1	0	0	0	0	2	3	16
C	3	4	0	0	0	0	1	0	1	1	13
D	3	3	0	0	0	0	1	0	0	0	7
E	1	1	0	0	1	2	0	0	3	2	11
F	0	4	0	0	0	0	0	0	0	0	4
G	3	5	0	0	0	0	0	0	2	1	11
H	2	2	0	0	0	0	0	0	4	1	9
I	2	3	0	0	1	1	0	2	2	0	11
J	4	4	0	0	1	1	0	1	4	0	15
K	3	2	0	0	0	0	0	0	1	0	6
L	4	7	0	1	1	1	0	0	0	0	17
M	4	5	0	0	0	0	0	1	0	1	11
N	2	2	0	0	1	1	0	1	6	3	19
O	5	3	0	0	1	1	0	1	3	2	16
P	2	0	0	0	0	2	1	0	0	2	10
Q	7	6	0	2	0	0	0	0	3	0	20
Totals	54	59	0	4	5	11	3	6	35	17	216

Table 21
L--CASES ITEMS.

Teacher	1 & 2	3	4	5	6	7	8	9	12	13	To- tals
A	R ₁ E.L ₁ E.	0	0	1	1	0	0	2	2	0	11
B	0	1	0	0	0	0	0	1	1	0	6
C	1	1	0	0	0	0	0	1	1	1	8
D	2	1	0	0	1	1	0	1	0	4	11
E	3	2	1	0	0	1	2	0	1	0	13
F	3	2	0	0	0	0	0	0	1	1	7
G	1	0	0	1	0	0	0	0	0	1	4
H	3	2	0	0	1	1	0	0	1	0	8
I	3	0	0	0	0	2	2	0	1	0	9
J	1	0	0	0	0	0	0	1	0	1	4
K	1	2	0	0	0	0	0	0	2	1	8
L	2	1	0	0	0	0	0	3	1	0	11
M	2	2	0	0	2	0	0	2	1	1	14
N	1	1	0	0	0	0	0	1	0	0	5
O	1	1	0	0	0	0	0	0	1	1	4
P	3	2	0	1	0	1	0	1	0	2	14
Q	2	2	1	2	0	1	1	0	2	1	15
Totals	30	21	3	4	5	4	4	12	9	11	152

Table 22
N--CASES ITEMS

Teacher	1 & 2	3	4	5	6	7	8	9	12	13	To- tals
A	R.E.L.E. 1	2	1 1 3	1 0	1 1	0 0	0 0	0 0	0 0	3	15
B	1	2	1 1 0	0 0	3 1	0 0	1 0	0 0	0 0	1	11
C	2	0	2 1 0	0 0	1 0	0 0	1 0	0 0	0 0	0	8
D	0	2	1 1 4	1 2	0 0	0 0	0 0	1 1	1 1	4	21
E	1	1	1 1 2	0 0	2 0	0 0	0 0	1 1	0 0	2	11
F	0	1	1 1 0	0 0	0 1	0 0	2 1	1 1	1 1	2	10
G	0	2	2 0 3	1 0	2 2	0 0	0 0	0 0	0 0	0	14
H	1	2	3 1 1	0 0	2 3	0 0	2 1	1 0	0 0	1	22
I	1	2	3 1 3	1 1	3 3	0 0	1 2	2 2	2 2	4	30
J	1	3	2 4 4	1 0	3 3	0 0	1 0	0 0	0 0	0	23
K	1	3	5 1 1	1 1	3 4	0 2	4 0	0 0	0 0	1	28
L	1	2	4 4 3	1 2	2 2	0 0	2 1	1 1	1 1	1	26
M	1	4	6 1 1	5 2	4 5	0 0	0 0	3 1	1 1	2	36
N	0	1	3 0 2	0 0	1 2	0 0	1 0	0 0	0 0	0	11
O	3	5	6 3 3	2 1	2 2	0 0	1 1	4 2	2 2	3	43
P	0	0	3 1 2	0 0	3 1	0 0	0 0	1 1	1 1	2	17
Q	1	2	4 2 3	0 0	2 4	0 0	2 4	4 0	0 0	3	28
Totals	15	21	31 39 42	13 10	34 34	0 2	18 19	9 29			354

CHAPTER IV.

Conclusions and Recommendations.

In consideration of the facts previously stated and in the light of the results of this investigation we venture the following conclusions:

1. In general there is a high degree of reliability of teachers' tests of eyesight of school children. Teachers, having showed their capability to act in accordance with directions without previous experience should increase such reliability with practice. This investigation shows the initial reliability approximately 80%.

2. Teachers do not show an equal degree of reliability as regards each of the various eye-defects to which children are subject. Hyperopia is apparently not quite so difficult to ascertain as is myopia. Its degree of reliability in terms of the sum of complete and close agreement as determined from Tables 19 to 22 is 89.5%, while that of myopia determined in a similar manner is 72.5%. Slight cases of astigmatism are probably the most difficult to ascertain, especially among children of the lower grades; bad cases of astigmatism are easily detected. The reliability of astigmatism as determined from Table 19 to 20 is 72.6%. The reliability of sore eyes is 81%, and for headaches, 83 %.

3. The degree of the reliability of teachers' tests of both eyes of school children shows a tendency for the test of the right eye to be slightly more reliable than that of the left eye. (Table 19 to 22) This tendency might be overcome

if a greater number of teachers were considered.

4. The reliability of teachers' recommendations (Item 13) as regards school children's eyes is 74.5%; the reliability of teachers' judgment regarding the degree of defect (Item 12) is 92%. Teachers can therefore better diagnose than prescribe what should be done in the case of defective eyes.

The following recommendations are offered:

1. That all elementary school teachers should examine their pupils' eyes at the beginning of each school year and report immediately to the parents or superintendent such cases as need expert attention. When in doubt another test should be made within a short time.

2. That teachers pay particular attention to illumination when testing the eyes of their pupils, and provide if possible a light which can be thrown on the eye-chart whenever testing is to be done so as to keep the illumination uniform for all cases examined.

3. That teachers be continually on the watch for sore eyes and headaches which may be associated with eye trouble. Sore eyes and headaches are often suggestive of latent trouble.

4. That not too much significance be given to the astigmatic-chart test, especially in the lower grades, unless the pupil can tell definitely what he sees. Teachers will need to practice questioning little folks so as to eliminate the element of suggestion if reliable results are to be obtained with the use of the astigmatic chart.

5. In conclusion, it is recommended that teachers be re-

quired by law or otherwise to familiarize themselves with some standard method of eye-testing, to provide themselves with the materials necessary for making tests, and to report at stated intervals to some authority the condition of the eyes of each pupil under their control. The principles of this method should in time be extended to include examination of ears, nose and throat, also. There is no reason why major defects which affect vitally the progress and health of school children should not be detected at an earlier date than they are at present. In the case of Pupil 1, Chart 1, Dr. Scheib stated that the undeveloped condition of the left eye could have been prevented, if the case had been given attention at the age of six, by simply covering the right eye for an hour or two a day and letting the left eye do the work. There is already obtainable through such sources as Dr. Allport of Chicago, The American Medical Association, The New York State Department of Public Health, the schools of education of some universities, and others, considerable material adapted to the use of the teachers dealing with methods and means of detecting diseases of the eyes, ears, nose, and throat. Further delay in these matters is unpardonable.

The duty of normal schools and Teachers' Colleges in training prospective teachers to give these tests is clearly indicated by the facts presented above.

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